



Fundy Model Forest

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Creel Census 2000

Sussex Fish and Game Association

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A Creel census was conducted in the spring of 1995, with the cooperation of the New Brunswick Department of Natural Resources & Energy (NBDNR&E) staff, to determine fishing pressure and success on the mainstem of the Kennebecasis River and its tributaries. The survey was designed to provide statistical information on angling effort and success

on the system. The fishing community had expressed concern regarding the current game fish stocks in the Kennebecasis River System and was interested in collecting data to properly assess this problem. Two field technicians were employed to conduct this census. Data on fishing pressure and catch by the angling community was collected through site to site visits.

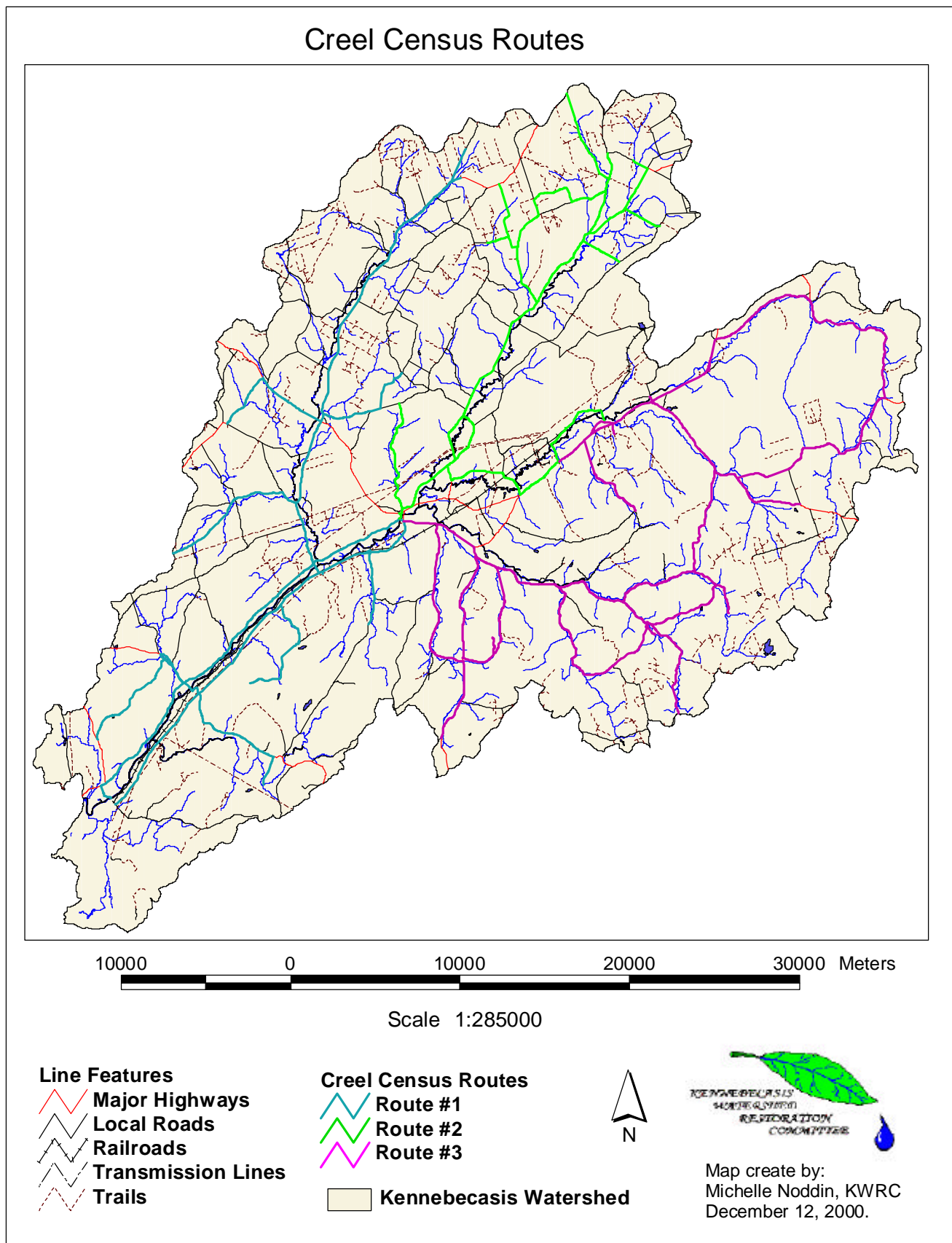
In the spring of 2000, a repeat survey was undertaken to reassess the angling effort and success on the Kennebecasis River System. In addition to collecting the same information as the 1995 Creel Census on effort and catch, information on the fishermen's area of residence and their opinions on the quality of fishing in recent years was also collected (Appendix E).

Methods and Materials:

The creel census was conducted from April 27th to June 22nd, 2000. Survey days for the census were selected to coincide with the similar sampling period in 1995, (Appendix B). The Kennebecasis Watershed was divided into the same three sections as the 1995 Creel Census survey to delineate seasonal fishing effort (Figure 1). The use of the same routes and similar dates made the two surveys comparable, so that conclusions could be drawn. Routes one and two were the first routes to be surveyed due to their locations within the lower and middle reaches. As the season progressed, more emphasis was placed on the middle and upper reaches, routes two and three respectively. This was done to coincide with fish migration upstream throughout the spring months which is reflected by fishing pressure being reduced on the lower reaches represented by route one. A table of the three routes can be found in Appendix A.

During the Creel Census, the census clerks obtained data by driving one of the designated routes, going to local fishing holes and various other areas that had access to the stream or river where anglers might be encountered via walking and/or driving. The standard creel census survey sheets, obtained from the NBDNR&E in 1995, were used in 2000 to maintain uniformity in data collection and to aid in a comparative analysis (Appendix C).

Figure 1. Routes surveyed for the Creel Census



Fish retained by the anglers surveyed were measured to obtain data on the age class of fish being harvested (Table 1). An estimation of the numbers and lengths of fish caught and released by anglers surveyed were also recorded. The total number of fish caught was derived from retained and released fish. Anglers that were surveyed multiple times during a single shift had their total time and catch at the last check time recorded. This ensured that no repetitive information was used in the tabulation of the final results.

Table 1. Age Class Determined by Fish Size

Age Class	Size (cm)
0+	<12.5
1+	12.5 to <17.5
2+	17.5 to 24.5
3+	>24.5 to 33
4+	>33

Results:

During April, May and June of 2000, a total of 36 weekdays and 26 weekend days were spent surveying the three routes in the Kennebecasis Watershed (Table 2). A total of 539 anglers were interviewed throughout the survey period, an increase of 87 anglers over the 452 surveyed in 1995 (Table 3). Of these surveyed anglers, 364 provided information on their area of residence, with 128 (35%) residing outside the watershed. The information compiled from this census showed that the surveyed anglers fished a total of 793 hours on the system, catching 648 trout, 234 (36%) of which were retained, and 414 (64%) were released. The average length of trout retained by the surveyed anglers in 2000 was 23.1 cm compared with 20.1 cm in 1995, an increase of 3 cm.

Table 2. Survey effort

Route Number	Dates	Survey Days		Number of Survey Hours		
		Week Days	Weekend Days	A.M.	P.M.	Evenings
1	April 27 to June 14	14 of 35	8 of 14	60	56	60
2	April 27 to June 22	12 of 41	10 of 16	68	56	52
3	May 3 to June 22	10 of 37	8 of 14	48	44	52
Totals		36 of 113	26 of 44	176	156	164

Please Note: Evenings = 5pm to 9pm.

Table 3. Angler Effort and Success

Route #	Dates	# of Days Surveyed	# of Anglers surveyed	Angler Effort (hrs)	# of Trout Caught	Ave. Catch /Hr.	# of Trout Retained	# of Trout Released
1	April 27 - June 14	22 of 49 (45%)	274	375.4	101	0.269	87 (86%)	14
2	April 27 - June 22	22 of 57 (39%)	217	386.9	467	1.207	119 (25%)	348
3	May 3 - June 22	18 of 51 (35%)	48	30.63	80	2.612	28 (35%)	52
Totals 2000			539	792.93	648	0.816	234 (36%)	414
1995 Data			452	649.95	643	1.032	188 (29%)	455

One hundred completed trip anglers were interviewed during the 2000 creel census. Of these 100 anglers, 48 (48%) were unsuccessful in catching any trout while 52 (52%) were successful in catching one or more trout (Table 4). Of the successful anglers, 40 (77%) retained trout; 11 retained one, 12 retained two, 5 retained three, 6 retained four and 6 retained their limit of five. Compared to the results found in 1995, there was an increase of three percent completed trip anglers that caught and retained their limit in 2000. In 2000, anglers caught 181 trout 25 cm or greater on the system, making up 28% of all harvested trout surveyed. Comparatively, in 1995 the anglers surveyed caught 84 trout 25 cm or greater, constituting 13% of harvested trout on the system for the 1995 survey period.

Table 4. Completed Trip Data

Route #	# of Anglers Interviewed		# of Trout Retained		# of Trout Released		Ave. Catch / Completed Trip Angler	
	2000	1995	2000	1995	2000	1995	2000	1995
1	37	56	32	24	6	22	0.86	0.43
2	56	94	61	102	119	170	1.09	1.08
3	7	8	10	4	16	10	1.43	0.50
Totals	100	158	103	130	141	202	1.03	0.82
Average Catch / Successful Angler			1.98	1.67	2.71	2.59		

*Please Note: Ave. Harvest/Angler = # of Trout Retained / # of Anglers Interviewed

Forty six percent of the 648 trout caught by surveyed anglers during the creel census were taken using bait as the principle angling method (Appendix D). Of the 414 released trout,

135 (33%) were caught and released on bait. The projected catch for the Kennebecasis watershed during the survey period was 2769 trout. Of this projection, 1772 (64%) would have been released (Table 5). Of the fish released back into the system, 585 (33%) were caught using bait (Appendix D). This projected value is an improvement over the 1995 data where 63% of the released fish were caught and released on bait. With a conservative mortality rate of 35% for fish caught and released on bait, this equates to an additional 205 fish being lost on the system in 2000 down from 384 in 1995. The total projected removal from the population during the survey period in 2000 was subsequently 1262 trout or the projected harvest plus 20%.

Table 5. Projections from 2000 Creel Census (1995 results in brackets)

Route	Route 1	Route 2	Route 3	Totals
A. Ave. # of Anglers encountered on a weekday (aad)	8.21 (4.93)	7.42 (5.08)	1.9 (1.9)	
B. Ave. # of hours spent by an angler on a weekday (ctd)	2.14 (1.44)	2.78 (1.64)	2.9 (1.25)	
C. Ave. Catch per hour by anglers on a weekday (aad)	0.38 (0.34)	1.25 (1.58)	2.85 (5.12)	
D. Mean catch per day for a weekday (A*B*C)	6.67 (2.38)	25.87 (13.15)	15.8 (12.16)	
E. Mean # of hours effort per weekday (A*B)	17.60 (7.12)	20.64 (8.32)	5.54 (2.38)	
A1. Ave. # of Anglers encountered on a weekend day (aad)	19.88 (11.56)	12.8 (18.44)	3.38 (4.12)	
B1. Ave. # of hours spent by an angler on a weekend day (ctd)	4.42 (1.81)	2.51 (2.66)	1.5 (1.22)	
C1. Ave. Catch per hour by anglers on a weekend day (aad)	0.2 (0.24)	1.18 (1.18)	0.56 (2.97)	
D1. Mean catch per day for a weekend day (A1*B1*C1)	17.34 (4.94)	37.97 (57.96)	2.85 (14.91)	
E1. Mean # of hours effort per weekend day (A1*B1)	87.78 (20.87)	32.14 (49.12)	5.06 (5.02)	
Projected catch for weekdays (D * # of week days in sample period)	233.61 (81.02)	1060.56 (525.88)	584.72 (437.76)	
Projected catch for weekend days (D1 * # of weekend days in sample period)	242.78 (74.18)	607.47 (985.27)	39.96 (223.61)	
Total projected catch	476.38 (155.20)	1668.03 (1511.15)	624.68 (661.36)	2769.09 (2327.71)
Percent of catch retained	86.14 (63.49)	25.48 (29.35)	35.44 (6.92)	
Projected harvest	410.36 (98.54)	425.01 (443.52)	221.39 (45.79)	1056.76 (587.84)
Projected effort for weekdays (E*# of week days in sample period)	615.93 (241.94)	846.32 (332.60)	205.1 (85.5)	
Projected effort for weekend days (E1*# of weekend days in sample period)	1228.89 (313.02)	514.31 (832.97)	70.88 (75.24)	
Total projected effort (hours)	1844.82 (554.96)	1360.64 (1167.57)	275.98 (160.74)	3481.43 (1883.28)
Projected # of rod-days = A*# of weekdays in sample period +A1*# of weekend days in sample period	565.75 (340.88)	508.88 (516.87)	117.55 (130.28)	1192.18 (995.11)

The number of fish being caught on the mainstem of the Kennebecasis River in 2000 was approximately 25% of the total catch. In summary the total projected fishing effort was 3481 hours or 1192 rod-days during the survey period. The total projected catch during the survey period was 2769 trout, with sixty-four percent (64%) of these being released for a total projected harvest of 1056 trout (Table 5).

The percentage of larger trout caught and retained increased, compared with the 1995 Creel Census results with 66 (28%) of the harvested trout in 2000 being larger than 25 cm (\geq Age 3⁺) compared with 31 (16%) of the harvested trout in 1995 (Table 6). The average length of trout retained increased from 20.1 cm to 23.1 cm from 1995 to 2000.

Table 6. Comparison of the Age Classes of fish retained in 2000 & 1995

Route	0+		1+		2+		3+		4+		Totals	
	2000	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000	1995
1	0	0	2	2	44	30	37	8	4	0	87	40
2	0	4	8	22	91	102	19	19	1	1	119	148
3	0	0	6	0	17	6	5	3	0	0	28	9
Totals	0	4	16	24	152	138	61	30	5	1	234	197

As part of the 2000 Creel Census, anglers were asked if they felt fishing quality had improved, declined or remained constant over the past five years. Of the 263 anglers that responded, 68 (26%) felt that the quality of fishing had improved, 87 (33%) felt that it had declined and 108 (41%) felt that it had remained constant, neither improving or declining.

Discussion:

The Creel Census completed in the spring of 2000 was equivalent to the 1995 Creel Census. The similarities allow for a comparison of the fishing pressure and harvest between years. A comparison of the data collected in the 1995 and 2000 Creel Census indicates that the overall quality of fishing has improved. Fishermen were slightly more successful in 2000 in harvesting their limit with an increase of 3 percent. Fishermen were also out fishing more often and for longer periods of time. The projected fishing effort was 2769 hours, with a total projected harvest of 1056 trout. This is a marked increase from the 1883 hours, with a total projected harvest of 587 trout during the survey period in 1995.

The average size of fish retained in 2000 improved from 20.1 cm to 23.1 cm, an increase of 3 cm over the 1995 data. Data collected from the 2000 Creel Census showed an increase of 15% of 3⁺ and 4⁺ age class fish showing up in the creels of fishermen.

Sixty-four percent of the fish caught in 2000 were released. Of the fish released back into the system, the percentage of fish caught using bait decreased from 1995. After factoring in the 35% mortality rate of fish released from bait fishing, the total fish removed from the population during the survey period in 2000 were 1262 trout or the harvest plus 20%, a decrease of 8% from 1995. The decreased number of fishermen using bait lowered the number of additional fish being lost from the population by this angling method, a conservation improvement for the system.

Conclusions:

Bait, as an angling method is very hard on the fish that are released. Conservative figures suggest a 35% mortality rate of fish released from bait angling. This mortality causes large numbers of released fish to be lost from the local population. For this reason, one of the conclusions of the 1995 report proposed the exclusive use of artificial bait (flies & lures) after June 1st for the mainstem of the Kennebecasis River. It is believed that this conservation initiative would have a significant impact on the fish that are released from angling. It is also felt that there would be very little inconvenience to anglers on the main river system as fly-fishing only is currently implemented after July 1st as a conservation method for Atlantic Salmon. This suggestion has yet to be adopted by regulatory agencies.

A habitat assessment conducted in 1994 and the information obtained through the 1995 Creel Census led the Sussex Fish & Game Association to develop three management objectives for Brook Trout. These were:

1. To increase the overall abundance of Brook Trout, but particularly the “Sea-Run” Trout component;
2. To increase the average size of Brook Trout caught; and
3. To ensure that populations of both "Resident" and “Sea Run Trout” are self-sustaining.

There were three strategies recommended to meet these objectives. These included:

1. Limiting the exploitation of Brook Trout stocks to ensure greater spawning escapement;
2. Targeting conservation efforts towards older aged, larger size trout as the most desirable spawners (greatest probability that they are of “Sea-Run” stock), increasing survival rates for aged 2 and 3 year old trout; and
3. Reducing the mortality rate for the trout released by anglers.

Due to the lower than desired size of the fish population a new regulation package was proposed in 1995 to address the situation. The new regulations were directed at providing a sanctuary area for larger trout, reducing the mortality from bait angling and reducing the harvest of large trout by limiting the daily harvest of fish over 25 cm.

Of these three management objectives only one was obtained. A “No Kill” section on the mainstem of the Kennebecasis was implemented in 1996. The section covers important summer habitat for larger Brook Trout on the mainstem from McCully Station up stream to Portage Vale. Problems with making adjustments to Federal Fisheries regulations encumbered the other 2 conservation measures from being implemented.

When the data for the two surveys are compared, a number of positive conclusions can be drawn. There was an increase in the amount of fishing effort on the system during the

survey period in 2000 over 1995. These anglers had greater success in harvesting more trout as well as larger trout than anglers in 1995. Of the anglers surveyed more were successful in catching their limit of five trout during their outings. Also, based on length data from the fish obtained, the population of two and three-year old trout had increased (Table 6).

Even though numbers from this study would suggest that the overall quality of angling has improved on the system, opinions of the anglers surveyed still show that approximately three quarters (74%) feel that the quality of angling has remained constant or declined since 1995. The Sussex Fish & Game Association feels confident that the conservation measures (i.e. No Kill Zone) implemented in 1996 as a result of its findings through the 1994 Habitat Assessment report and the 1995 Creel Census and the many physical habitat restoration initiatives are having a positive impact on trout populations in the Kennebecasis Watershed. The Sussex Fish & Game Association feels that more effort must be made to promote the successes realized thus far on the Kennebecasis system, so that public opinions change to view this system as a recovering asset. This organization still feels that more can and must be done to improve mature trout populations on the Kennebecasis and continues to work toward these goals through education, promotion and physical habitat restoration initiatives.

Appendix A
Creel Census Routes

Table A1. Routes surveyed for the Creel census

Route Number	Area Surveyed
Route 1.	Mainstem Kennebecasis River from the Trans – Canada Hwy. Route 1 bridge at Sussex to the Bloomfield bridge, Millstream River, Sharpe Brook, McNair Brook, Mill Brook, Musquash Brook, Moosehorn Brook, Almshouse Brook, and Clements Brook.
Route 2.	Mainstem Kennebecasis River from the bridge on the Back road at Penobsquis to the Trans – Canada Hwy. Route 1 bridge at Sussex, Smiths Creek, McGregor Brook, Windgap Brook, Sally Brook, Dee Brook and Stone Brook.
Route 3.	Mainstem of the Kennebecasis River from its' headwaters to the bridge on the Back road at Penobsquis, Trout Creek, Parson's Brook, Mill Brook, Parlee Brook, Cedar Camp Brook, Negro Brook, McLeod Brook, Calamingo Brook, and the South branch of the Kennebecasis River.

Appendix B
Schedule for Creel Census

Table B1. Creel Census Schedule – April to June 2000.

Days	Route	Time	Route	Time
27-Apr	1	1pm-9pm	2	8am-4pm
28-Apr	1	8am-4pm	2	Split
29-Apr	1	Split	2	1pm-9pm
02-May	1	1pm-9pm	2	8am-4pm
03-May	1	8am-4pm	3	Split
06-May	1	Split	2	1pm-9pm
08-May	1	1pm-9pm	2	8am-4pm
10-May	1	8am-4pm	3	Split
13-May	1	Split	2	1pm-9pm
14-May	1	1pm-9pm	2	8am-4pm
16-May	1	8am-4pm	3	Split
19-May	1	Split	2	1pm-9pm
20-May	3	1pm-9pm	2	8am-4pm
21-May	1	8am-4pm	3	Split
22-May	2	Split	3	1pm-9pm
25-May	1	1pm-9pm	3	8am-4pm
26-May	1	8am-4pm	2	Split
27-May	1	Split	3	1pm-9pm
28-May	1	1pm-9pm	3	8am-4pm
30-May	1	8am-4pm	2	Split
01-Jun	1	Split	2	1pm-9pm
03-Jun	1	1pm-9pm	2	8am-4pm
04-Jun	2	8am-4pm	3	Split
08-Jun	1	Split	3	1pm-9pm
10-Jun	2	1pm-9pm	3	8am-4pm
11-Jun	2	8am-4pm	3	Split
14-Jun	1	Split	3	1pm-9pm
17-Jun	2	1pm-9pm	3	8am-4pm
20-Jun	2	8am-4pm	3	Split
21-Jun	2	Split	3	1pm-9pm
22-Jun	2	1pm-9pm	3	8am-4pm

Appendix C
Survey Form & Question Sheet

Appendix D
Angler Method Tables

Table D1. Route 1 - Summary of Angler Method

Method	# Trout retained	# Trout released	Total Trout Caught
Bait	57	5	62
Fly	15	5	20
Fly/lure	2	0	2
Lure	13	4	17

Table D2. Route 2 - Summary of Angler Method

Method	# Trout retained	# Trout released	Total Trout Caught
Bait	84	90	174
Fly	35	252	287
Fly/lure	0	4	4
Lure	0	2	2

Table D3. Route 3 - Summary of Angler Method

Method	# Trout retained	# Trout released	Total Trout Caught
Bait	23	49	63
Fly	5	12	17
Fly/lure	0	0	0
Lure	0	0	0

Table D4. Total Summary of Angler Method

Method	# Trout retained	# Trout released	Total Trout Caught
Bait	164	144	308
Fly	55	269	324
Fly/lure	2	4	6
Lure	13	6	19

Appendix E
Fishermen Hometown Data

Table E1. Home Communities

Route 1		Route 2		Route 3	
Community	Sum	Community	Sum	Community	Sum
Apohaqui	24	Coles Island	2	Anagance	2
Belleisle Creek	2	Fredericton	2	Bloomfield	2
Berwick	1	Hampton	3	Millstream	2
Bloomfield	28	Moncton	48	Moncton	14
Cassidy Lake	5	Norton	1	Penobsquis	3
Chance Harbour	2	Penobsquis	9	Petticodiac	1
Darling's Island	1	Portagevale	2	Plumweseep	1
Dumfries	1	Riverview	1	Quispamsis	1
East Scotch Settlement	1	Roachville	1	Riverglade	1
Florenceville	2	Rothesay	1	Rothesay	1
FoxHill	1	Sackville	2	Saint John	5
Hampton	19	Saint John	5	Salisbury	3
Hillsdale	2	Salisbury	2	Sussex	9
Keirstead Mountain	1	Sussex	30	Waterford	1
Knightville	1	Titusville	1		
Knightville Rd	1				
Lower Millstream	9				
Millstream	3				
Moncton	3				
New Canaan	2				
Norton	13				
Nova Scotia	1				
Oromocto	1				
Pennfield	2				
Waterford	1				
Quispamsis	3				
Riverbank	1				
Roachville	1				
Saint John	3				
Rothesay	5				
Saltsprings	1				
Searsville	2				
Southfield	3				
St. George	2				
Summerfield	2				
Sussex	54				
Sussex Corner	1				
Titusville	1				
Wards Creek	1				
Willow Grove	1				